Electronic Version
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Claims

[c1] What is claimed is:

1. A method of fluoride-containing wastewater treatment, comprising:

performing a primary fluoric ion concentration detection process upon wastewater;

introducing the wastewater into a first reaction tank, and perform a primary calcium salt addition process to add calcium salt into the first reaction tank so that fluoric ions contained in the wastewater react with the calcium salt and form calcium fluoride, a dosage of the calcium salt in the primary calcium salt addition process being determined according to a fluoric ion concentration detected in the primary fluoric ion concentration detection process;

introducing the wastewater and the calcium fluoride into a second reaction tank, and performing a secondary calcium salt addition process to add calcium salt into the second reaction tank so that the fluoric ions remaining in the wastewater react with the calcium salt and form calcium fluoride;

performing a solid-liquid separation process to separate the calcium fluoride from the wastewater;

performing a secondary fluoric ion concentration detection process upon the wastewater after the calcium fluoride is separated; and

adjusting a dosage of the calcium salt in the secondary calcium salt addition process according to a fluoric ion concentration detected in the secondary fluoric ion concentration detection process.

[c2] 2. The method of claim 1, wherein the calcium salt added in the primary calcium salt addition process and in the secondary calcium salt addition process comprises calcium chloride and calcium hydroxide.

[c3] 3. The method of claim 2, wherein the first reaction tank is maintained in an acidic condition.

[c4] 4. The method of claim 1, further comprising performing a neutralization process after the secondary calcium salt addition process is performed.

[c5] 5. The method of claim 1, wherein the primary fluoric ion concentration detection process comprises:

providing a buffer solution having a stable pH value;

adding a fixed amount of the wastewater into the buffer solution;

detecting the fluoric ion concentration of the buffer solution; and

estimating the amount of fluoride contained in the wastewater to determine the dosage of the calcium salt added in the primary calcium salt addition process.

[c6] 6. The method of claim 1, wherein the solid-liquid separation process comprises:
introducing the wastewater and the calcium fluoride from the second reaction tank into a rapid mixing tank, and adding flocculants into the rapid mixing tank to form calcium fluoride flocs;
delivering the wastewater and the calcium fluoride flocs from the rapid mixing tank to a slow mixing tank, and adding polymer medicaments to develop the calcium fluoride flocs; and
delivering the wastewater and the calcium fluoride flocs from the slow mixing tank to a setting tank so that the wastewater and the calcium fluoride flocs are separated due to different specific gravities.

[c7] 7. The method of claim 6, wherein the flocculants comprise poly aluminum chloride (PAC).

[c8] 8. The method of claim 6, further comprising performing a concentration process after the wastewater and the calcium fluoride flocs are separated.

[c9] 9. A method of fluoride-containing wastewater treat-

ment, comprising:

performing a primary fluoric ion concentration detection process upon wastewater, the primary fluoric ion concentration detection process comprising:

providing a buffer solution having a stable pH value;

adding a fixed amount of the wastewater into the buffer solution;

detecting a fluoric ion concentration in the buffer solution; and

estimating the amount of fluoride contained in the wastewater;

introducing the wastewater into a first reaction tank, and performing a primary calcium salt addition process to add calcium salt into the first reaction tank so that fluoric ions contained in the wastewater react with the calcium salt and form calcium fluoride, a dosage of the calcium salt added in the primary calcium salt addition process being determined according to the fluoric ion concentration detected in the primary fluoric ion concentration detection process;

introducing the wastewater and the calcium fluoride into a second reaction tank, and performing a secondary calcium salt addition process to add calcium salt into the second reaction tank so that fluoric ions remaining in the wastewater react with the calcium salt and form calcium fluoride;

performing a solid-liquid separation process to separate the calcium fluoride from the wastewater;
performing a secondary fluoric ion concentration detection process upon the wastewater after the calcium fluoride is separated; and
adjusting a dosage of the calcium salt added in the secondary calcium salt addition process according to a fluoric ion concentration detected in the secondary fluoric ion concentration detection process.

[c10] 10. The method of claim 9, wherein the calcium salt added in the primary calcium salt addition process and in the secondary calcium salt addition process comprises calcium chloride and calcium hydroxide.

[c11] 11. The method of claim 10, wherein the first reaction tank is maintained in an acidic condition.

[c12] 12. The method of claim 9, further comprising performing a neutralization process after the secondary calcium salt addition process is performed.

[c13] 13. The method of claim 9, wherein the solid-liquid separation process comprises:
introducing the wastewater and the calcium fluoride in the second reaction tank into a rapid mixing tank, and adding flocculants into the rapid mixing tank to form

calcium fluoride flocs;

delivering the wastewater and the calcium fluoride flocs from the rapid mixing tank to a slow mixing tank, and adding polymer medicaments to develop the calcium fluoride flocs; and

delivering the wastewater and the calcium fluoride flocs from the slow mixing tank to a setting tank so that the wastewater and the calcium fluoride flocs are separated due to different specific gravities.

[c14] 14. The method of claim 13, wherein the flocculants comprise poly aluminum chloride (PAC).

[c15] 15. The method of claim 13, further comprising performing a concentration process after the wastewater and the calcium fluoride flocs are separated.